SERVIR: Leveraging Earth observations for addressing development challenges in West Africa

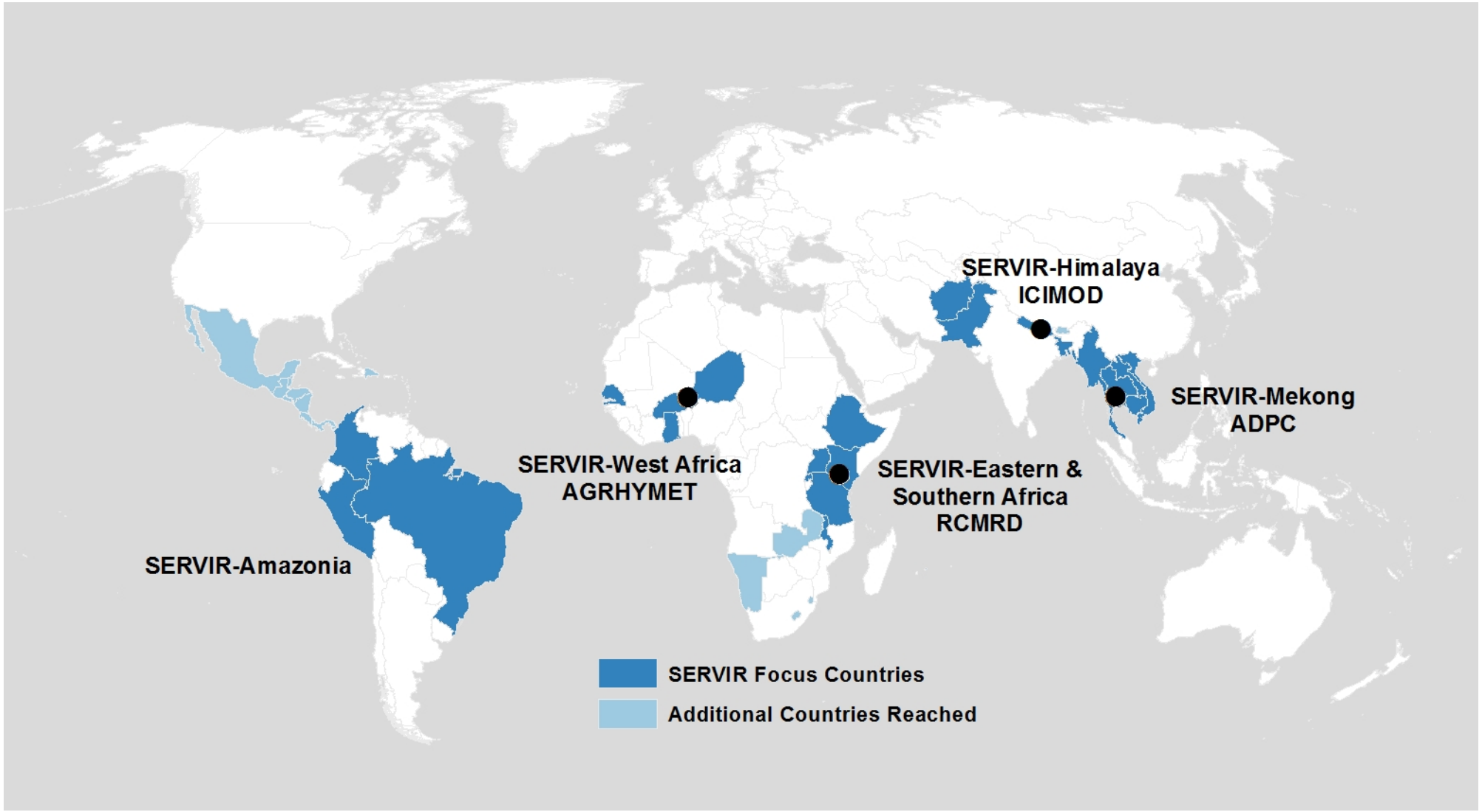
Rebekke Muench
Emily Adams
Kelsey Herndon
Emil Cherrington

SERVIR

CILSS adpc RCMRD ICIMOD USAID FROM THE AMERICAN PEOPLE NASA

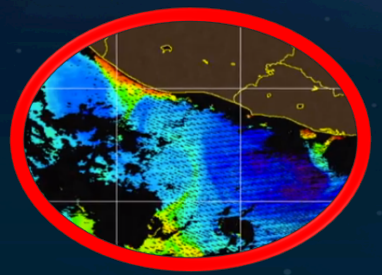
Overview

1. SERVIR program overview
2. Service planning
3. SERVIR-West Africa Hub
   - Water overview
   - Ephemeral water body monitoring
4. Network activities
5. What's next: Upcoming activities


SERVIR-Himalaya
ICIMOD
SERVIR-Mekong
ADPC
SERVIR-West Africa
AGRHYMET
SERVIR-Eastern &
Southern Africa
RCMRD
SERVIR-Amazonia
SERVIR Focus Countries
Additional Countries Reached

SERVIR is a joint development initiative of NASA and USAID, working in partnership with leading regional organizations around the globe, to help developing countries use information provided by Earth observing satellites and geospatial technologies to address Food Security, Water and Disasters, Weather and Climate, and Land Use/Land Cover Change.

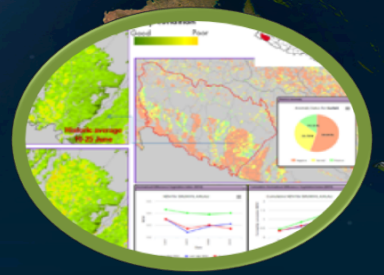
Source: NASA



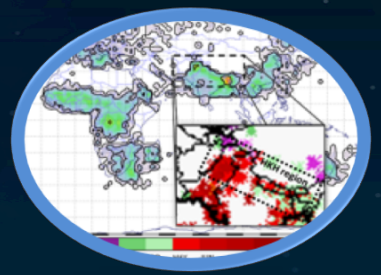
Preventing seafood poisoning by mapping harmful microalgae

Helping herders and farmers by detecting ephemeral water bodies

Conserving forests by mapping land cover and land use change

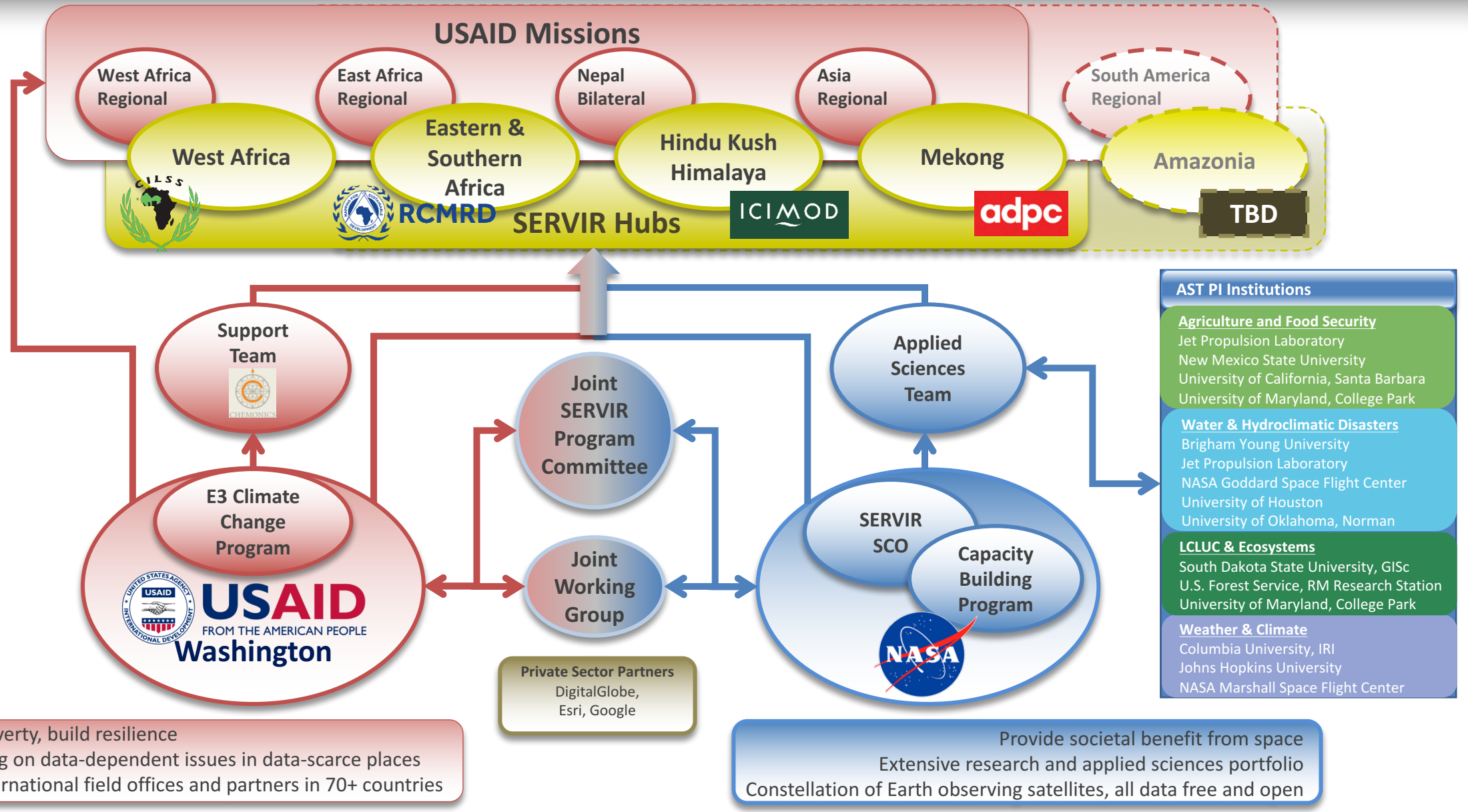


Supporting food security by monitoring agricultural drought



Protecting lives by monitoring and forecasting intense thunderstorms

SERVIR's integrated global structure



Satellites & sensors used

Satellite/Sensor Name	Projects Using Data
ALOS (Japanese) (PALSAR data) *	1*
AltiKa (French, Indian)	1
AMSR-E on Aqua *	3*
ASAR (European) Envisat	1
ASTER	3
Digital Globe constellation**	3
EO-1 ALI, Hyperion	1
GPM	1
GRACE	2
ICESat (GLAS)*	1*
Jason-2	1
LANDSAT 5*, 7, and 8	9
Meteosat (European)	2
QuikSCAT *	1*
Radarsat-2 **	3
SMOS (European)	1
SRTM	8
Terra and Aqua- MODIS	18
TRMM*	10
SMAP	3
VIIRS	8

21 Satellites/Sensors In Use

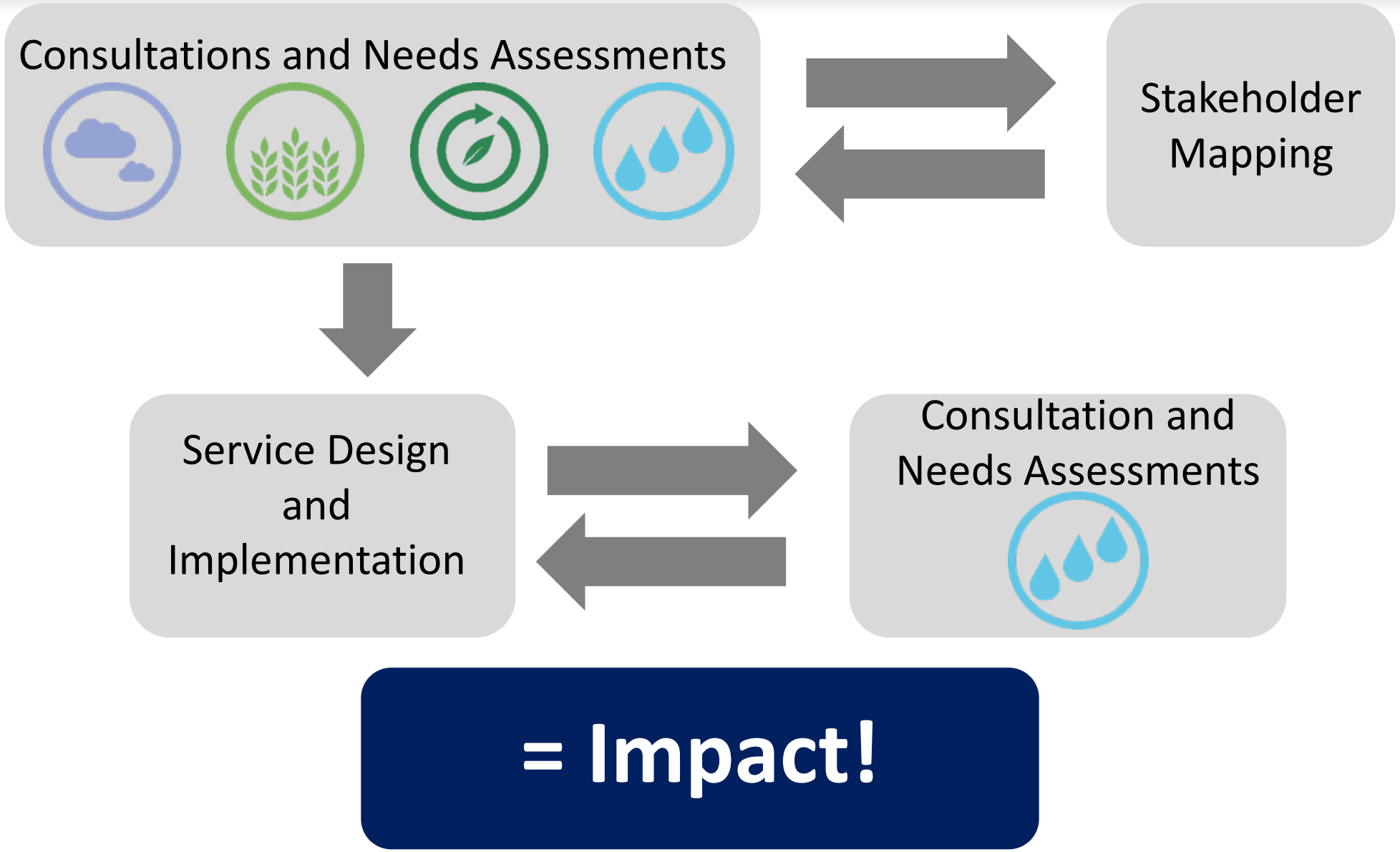
Planned Use of Satellites/Sensors	
ICESat-2	1
Jason-3	1

Satellites/Sensors being Explored for Use
OCO-2
ISS-RapidScat
CATS
Sentinel -1, -2, -3

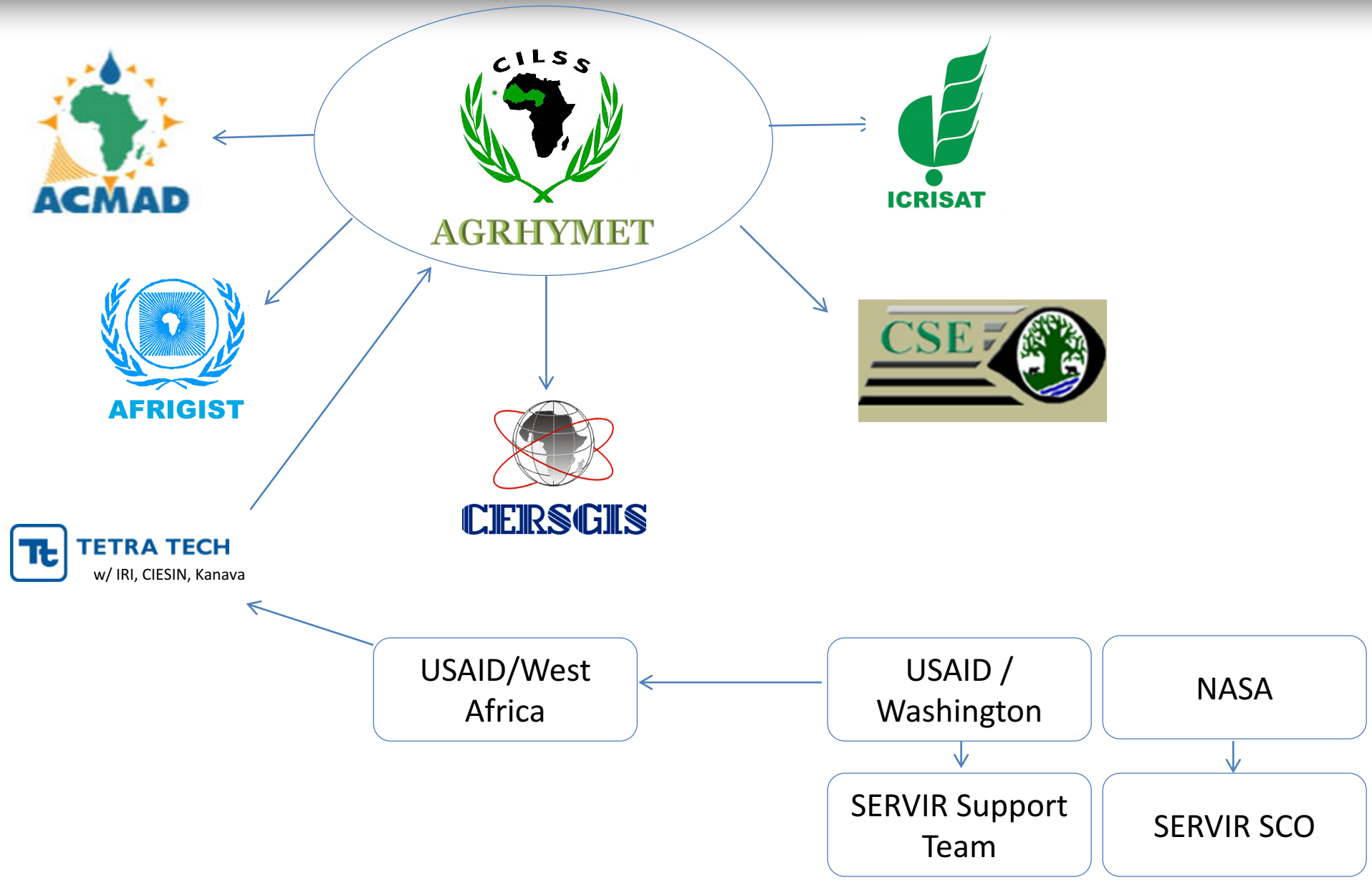
* Satellite/sensor no longer producing data

** 5 Commercial Satellites in use through a unique data collection tasking agreement

The Service Planning Approach



SERVIR-West Africa partners



Overview of SERVIR-West Africa activities

Agriculture:

- Land degradation monitoring service
- Rangeland monitoring project

Land use / ecosystems:

- Forest biomass monitoring service
- Forest fragmentation project

Water & related disasters:

- Ephemeral water body monitoring service
- West Africa LDAS for flood / drought project

Weather & climate:

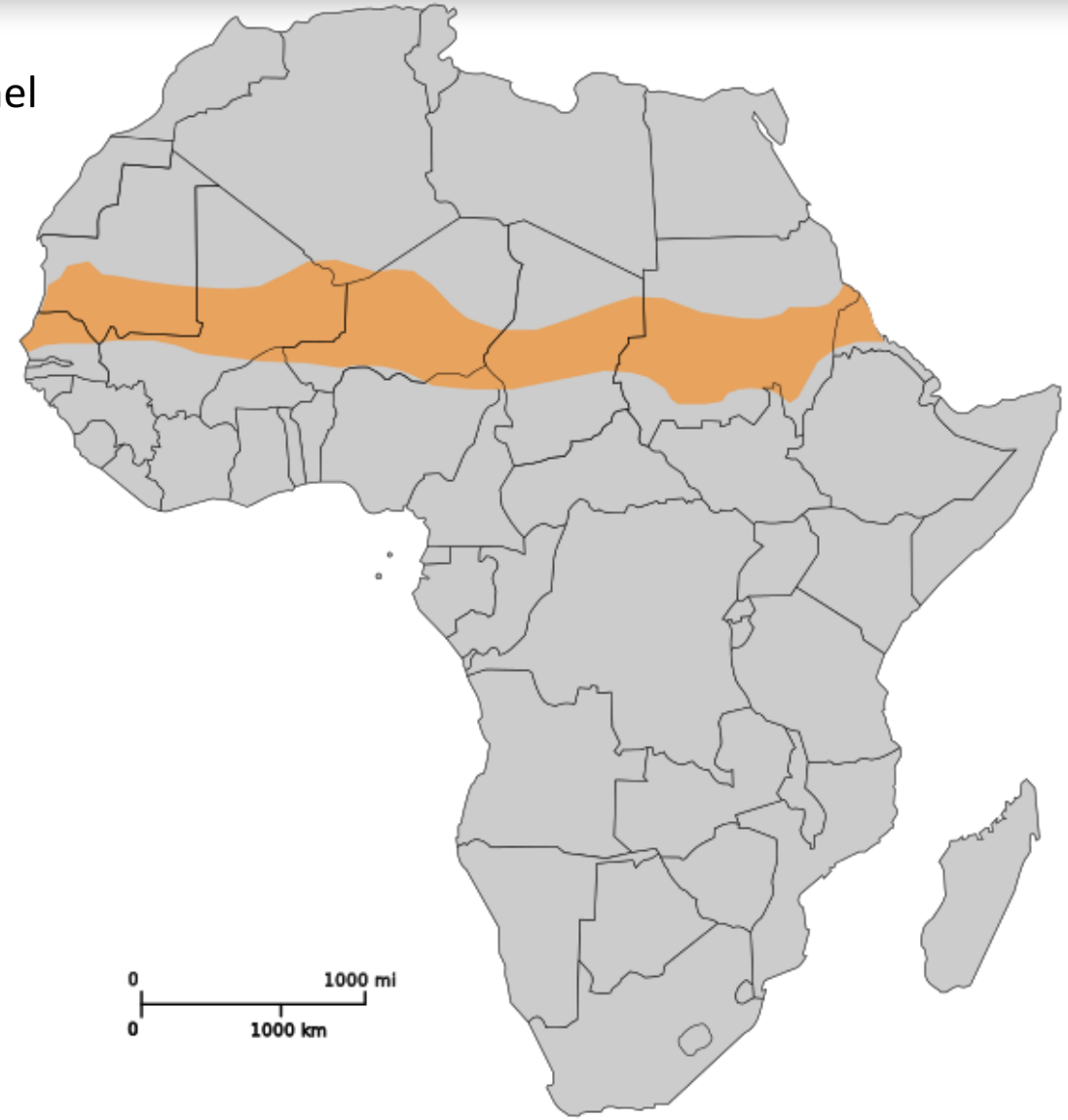
- Desertification / re-greening project

Overview of SERVIR-West Africa activities

- *Supporting pastoralist communities in West Africa: RS of rangeland forage production, vegetation structure & trend* (Senegal): N. Hanan, NMSU
- *Monitoring and Projecting Environmental Change in Fragmented Tropical Forest Landscapes* (Ghana): M. Wimberly, SDSU
- *Desertification or "Re-Greening"? Adaptation Lessons Learned in Coping with Drought* (Niger): A. Giannini, Columbia U.
- *A West Africa LDAS for Forecasting Extreme Hydrological Events*: A. Getirana, NASA GSFC

Surface Water Availability for Pastoralists and Smallholder Agriculturalists

The Sahel



Map credit from Open Access Wikimedia Commons
By Pechristener - https://commons.wikimedia.org/wiki/File:Map_sahel_2.svg, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=53921889

Photo credit from Open Access Wikimedia Commons:
By Marco Schmidt [1] - Own work (own photo), CC BY-SA 2.5, https://commons.wikimedia.org/w/index.php?curid=1039453

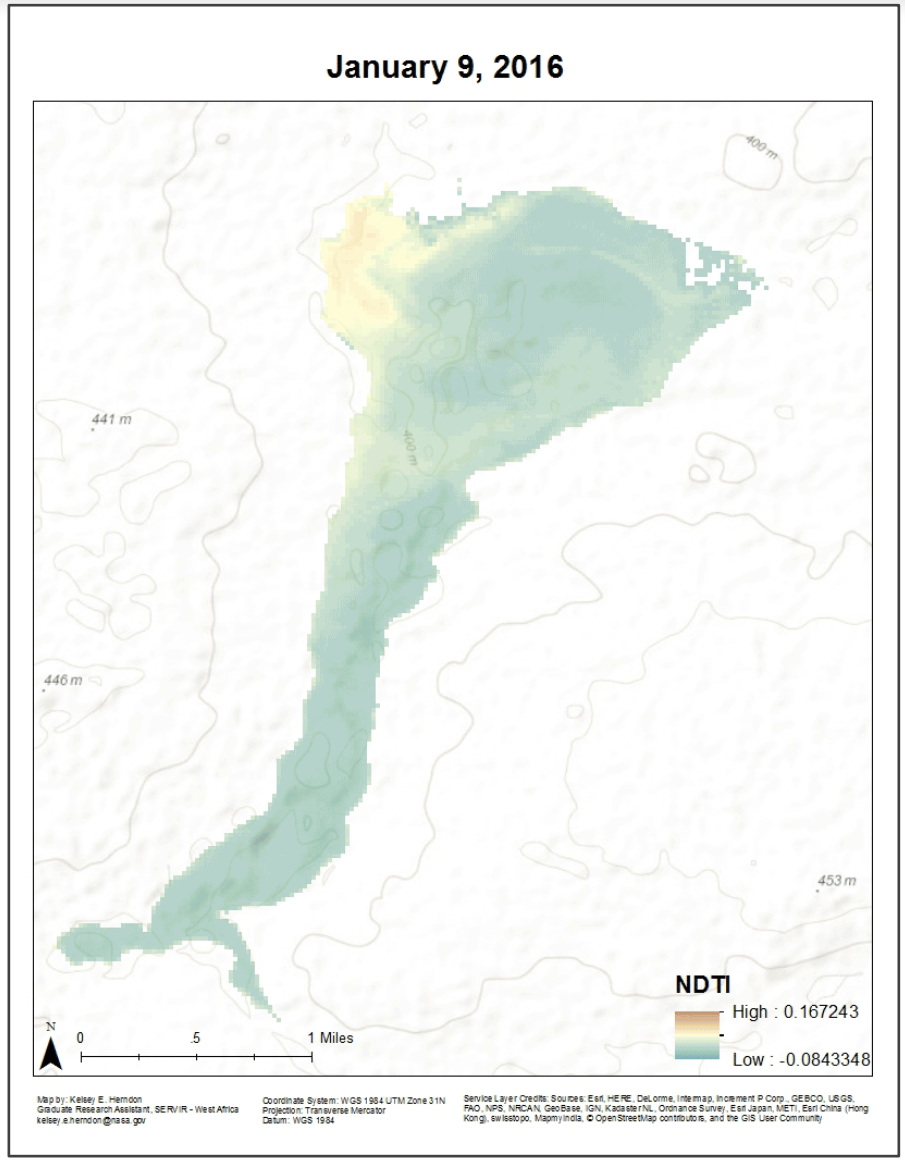
Image Credit: Google Earth, Digital Globe

A Statistical Model for Water Body Forecasting in the Ferlo Region of Senegal

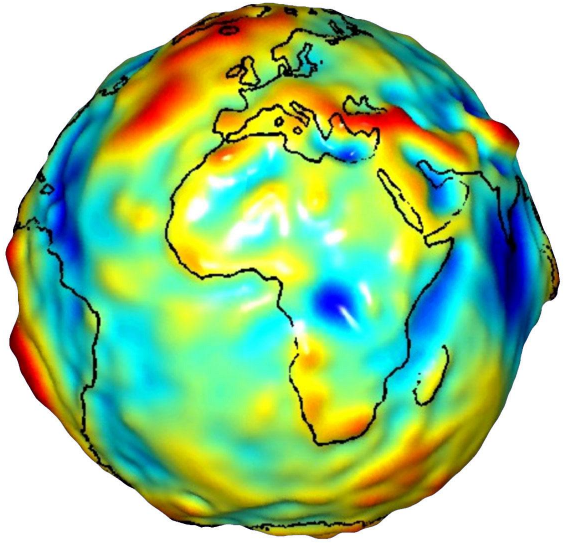
- A statistical model for calculating the probability of surface water
- Short-term forecast
- Agricultural extension officers are the intended end-users
- Contribute to resource management by pastoralists and smallholder agriculturalists

Preliminary Water Body Mapping in the Tahoua Region of Niger

- Distribution of surface water highly variable from season to season and year to year
- Surface water occurrence is highly dependent on precipitation.
- Changing patterns of precipitation amounts and intensity will impact the distribution of surface water.



Groundwater Monitoring



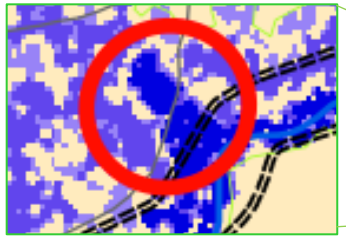
Source: NASA

Photo credit from Open Access Wikimedia Commons: By Dominique Thaly - Own work (own photo), CC BY-SA 2.5, https://commons.wikimedia.org/wiki/File:Pastoral_well.JPG

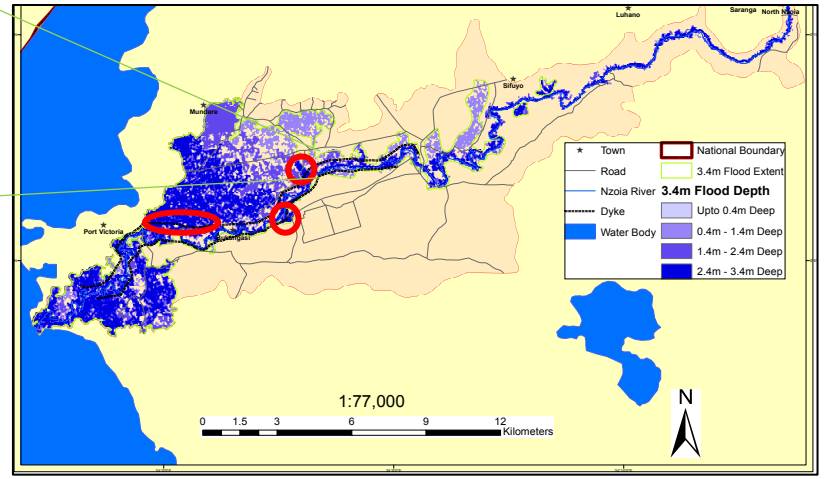
- SERVIR West Africa and NASA are partnering with Mercy Corps to model ground water in Niger.
- Ground water is an important source, especially in the arid region of sub-Sarahan Africa where there is limited surface water for consumption and farming

Benefits of the Network

SERVIR Eastern & Southern AFRICA

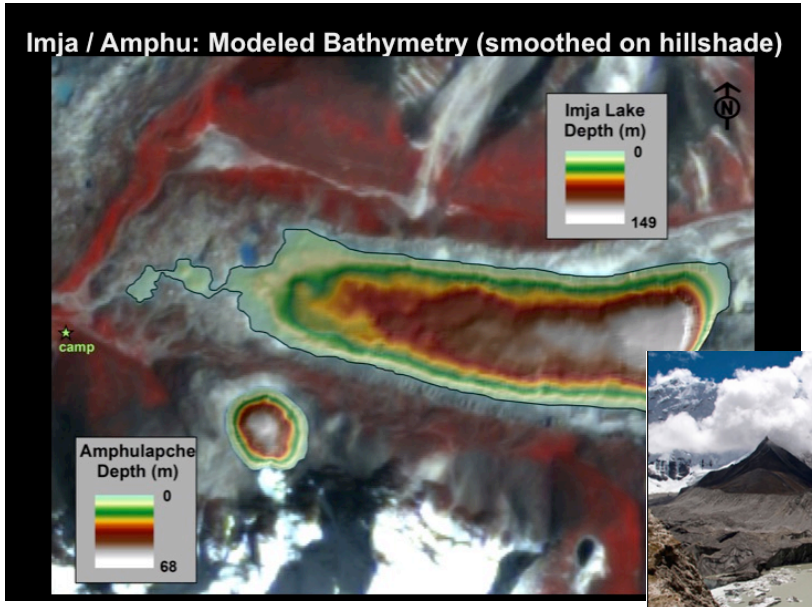


Working to protect against this



Flood level scenario map showing potential dike breach areas of concern

SERVIR HIMALAYA



Flood Mapping Tool in Eastern & Southern Africa

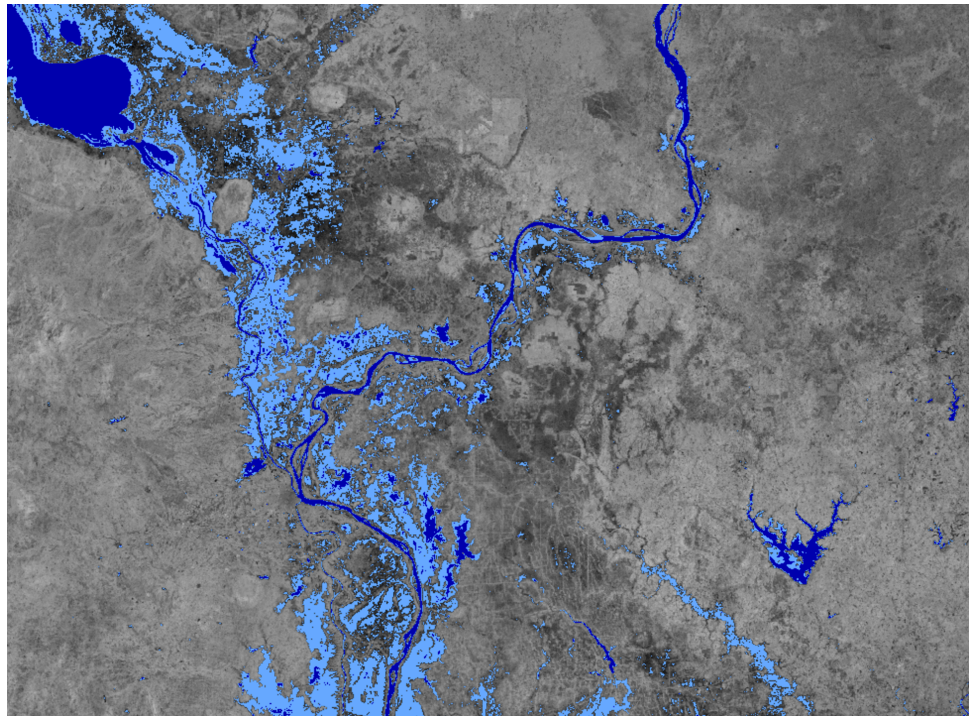
- A flood mapping tool provided high-accuracy flood level scenario maps to inform the World Bank's Water Security and Resilience Project, which provided financial assistance to design and implement repairs to flood protection dikes.

Glacial Lake Lowering

- The Department of Hydrology and Meteorology in Nepal agreed to lower the water level of Imja lake after an analysis of the likelihood and severity of a glacial lake outburst flood indicated this region to be particularly at risk

Benefits of the Network

SERVIR MEKONG



Dam Inundation Mapping Tool

- This tool helps identify where historical floods have occurred in the region for flood management and helps monitor flood conditions when they occur. Furthermore, this tool helps identify where valuable water is in the region during the drought season.

SERVIR GLOBAL

Training on the Variable Infiltration Capacity Model and Bias Correction of Satellite Precipitation Data

- Arising from a need from all the hubs, the SCO organized a training focusing on the implementation of the VIC model and two Bias Correction techniques. Individuals from every hub were present

What's next: Future activities

- Capacity-building activities
- Technical exchanges with project scientists
- IT infrastructure development
- Service development
- Expansion of models used by consortium members
- Increased access to NASA data


SERVIR
Questions?
Connecting space to village
www.servirglobal.net